VERTICA

The International Journal of Rotorcraft and Powered Lift Aircraft

Editor-in-Chief
P. Friedmann (University of California, U.S.A.)

Author Index and Volume Contents

VOLUME 14, 1990

PERGAMON PRESS

Oxford · New York · Frankfurt · Seoul · Sydney · Tokyo

VERTICA

The International Journal of Rotorcraft and Powered Lift Aircraft

EDITOR-IN-CHIEF

Professor P. Friedmann

Mechanical, Aerospace and Nuclear Engineering Department, University of California, 5732H Boelter Hall, Los Angeles, CA 90024, U.S.A.

ASSOCIATE EDITORS

Dr W. Johnson
Johnson Aeronautics
Palo Alto
CA 94301, U.S.A.

Professor D. H. Hodges
School of Aerospace Engineering
Georgia Institute of Technology
Atlanta, GA 30332, U.S.A.

Dr F. Straub
Aeromechanics R & D
McDonnell Douglas Helicopters
Mesa, AZ 85205, U.S.A.

EDITORIAL ADVISORY BOARD

Professor I. C. Cheeseman
University of Southampton, U.K.

Professor A. Azuma
University of Tokyo, Japan

Professor I. Chopra
University of Maryland, U.S.A.

R. Dat
ONERA, Châtillon, France

Professor G. T. S. Done
The City University, London, U.K.

Professor N. D. Ham
Massachusetts Institute of Technology
U.S.A.

Mr Anton J. Landgrebe
United Technologies Research Center, U.S.A.

Dr M. V. Lowson
Westland Helicopters Ltd, U.K.

Professor R. G. Loewy
Rensselaer Polytechnic Institute, U.S.A.

Dott. Ing. B. Lovera
Construzioni Aeronautiche
Giovanni Agusta S.p.A., Italy

Dr Robert A. Ormiston
U.S. Army Research & Technology Labs
U.S.A.

Professor D. A. Peters
Georgia Institute of Technology, U.S.A.

M. G. Petit
Société Nationale Industrielle Aérospatiale
France

G. Reichert
Technical University Braunschweig
West Germany

Dr R. E. Singleton
U.S. Army Research Office, U.S.A.

Professor H. Wittenberg
Technische Hogeschool Delft
The Netherlands

Back Issues

Back issues of all previously published volumes, in both hard copy and on microform are available direct from Pergamon Press offices.

Publishing Office

Pergamon Press plc, Journals Production Unit, Hennock Road, Marsh Barton, Exeter, Devon EX2 8NE, England (Tel. Exeter (0392) 51558; Fax (0392) 425370).

Photocopying information for users in the U.S.A.

The Item-Fee Code for this publication indicates that authorization to photocopy items for internal or personal use is granted by the copyright holder for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service provided the stated fee for copying beyond that permitted by Section 107 or 108 of the U.S. Copyright Law is paid. The appropriate remittance of $3.00 per copy per article is paid directly to the Copyright Clearance Center Inc., 27 Congress Street, Salem, MA 01970. The copyright owner's consent does not extend to copying for general distribution, for promotion, for creating new works or for resale.

Permission for other use

The copyright owner's consent does not extend to copying for general distribution, for promotion, for creating new works, or for resale. Specific written permission must be obtained from the publisher for such copying.

The Item-Fee Code for this publication is: 0360-5450/90 $3.00 + 0.00

Copyright © 1990 Pergamon Press plc

The copyright covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproductions, microform, or any other reproductions of similar nature, and translations. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, electrostatic, magnetic tape, mechanical, photocopying, recording, or otherwise, without permission in writing from the copyright holder.

Whilst every effort is made by the publishers and editorial board to see that no inaccurate or misleading data, opinion or statement appears in this journal, they wish to make it clear that the data and opinions appearing in the articles and advertisements herein are the sole responsibility of the contributor or advertiser concerned. Accordingly, the publishers, the editorial board and editors and their respective employees, officers and agents accept no responsibility or liability whatsoever for the consequences of any such inaccurate or misleading data, opinion or statement.

™The paper used in this publication meets the minimum requirements of American National Standard for Information Sciences—Permanence of Paper for Printed Library Materials, ANSI Z39.48-1984.

Volume Contents

Number 1

M. B. Mathew and R. G. Loewy	1	Nonlinear effects in helicopter rotor forward flight forced response
H.-J. Pausder	19	A study of roll response required in a low altitude slalom task
Reinert H. G. Müller	31	Winglets on rotor blades in forward flight—a theoretical and experimental investigation
Dieter Braun, Hubert Frommlet and Alois Schwarz	47	FEL—a new main rotor system
R. A. Davis, C. J. Roberts and R. C. Johnson	61	A practical co-axial twin rotor model
G. Lehmann and R. Kube	69	Automatic vibration reduction at a four bladed hingeless model rotor—a wind tunnel demonstration
Yoshinori Okuno, Akira Azuma and Keiji Kawachi	87	Effects of difference in induced velocity distribution on the helicopter motion
Peretz P. Friedmann	101	Helicopter rotor dynamics and aeroelasticity: some key ideas and insights
	i	Guidelines for the preparation of typescripts for direct reproduction

Number 2

James M. Wang, Jinseok Jang and Inderjit Chopra	123	Air resonance stability of hingeless rotors in forward flight
M. Schaffar, J. Haertig and P. Gnemmi	137	Aerodynamic loads and blade vortex interaction noise prediction
Robert T. N. Chen	147	A survey of nonuniform inflow models for rotorcraft flight dynamics and control applications
D. G. Thomson and R. Bradley	185	Development and verification of an algorithm for helicopter inverse simulations
F.-W. Meyer	201	The influence of interactional aerodynamics of rotor–fuselage-interferences on the fuselage flow
Michelle M. Eshow, Diego Orlandi, Giovanni Bonaita and Sergio Barbieri	217	Results of an A109 simulation validation and handling qualities study

Th. van Holten 237 Hamiltonian mechanics as a possible alternative for deriving aero-elastic equations

Frederick H. Immen 241 The U.S. Army Helicopter Structural Integrity Program, 1989 European Rotorcraft Forum

Number 3

Wayne Johnson 255 Airloads and wake models for a comprehensive helicopter analysis

P. T. W. Juggins 301 Substantiation of the analytical prediction of ground and air resonance stability of a bearingless rotor, using model scale tests

Todd R. Quackenbush and Donald B. Bliss 313 Free wake flow field calculations for rotorcraft interactional aerodynamics

O. Rand 329 Theoretical modeling of composite rotating beams

A. R. Walker and D. B. Payen 345 Experimental application of strain pattern analysis (SPA)—wind-tunnel and flight test results

Fort F. Felker, Todd R. Quackenbush, Donald B. Bliss and Jeffrey S. Light 361 Comparisons of predicted and measured rotor performance in hover using a new free wake analysis

Heinz-Jürgen Pausder, Gerhard Bouwer and Wolfgang von Grünhagen 385 A highly maneuverable helicopter in-flight simulator—aspects of realization

J. Gordon Leishman and Nai-pei Bi 401 Measurements of a rotor flowfield and the effects on a fuselage in forward flight

Ching S. Chen and John O. Bridgeman 417 Three-dimensional viscous rotor flow calculations using a viscous–inviscid interaction approach

A. Desopper, P. Lafon and P. Ceroni 429 Influence of the control law on the performance of a helicopter model rotor

N. Tränapp 439 Wind effects on helicopter takeoff and landing

Book Review
R. E. Kelly 455 *Wing Theory* by R. T. Jones

Number 4

Inderjit Chopra 457 Perspectives in aeromechanical stability of helicopter rotors

Roberto Celi 509 Steady stall and compressibility effects on hingeless rotor aeroelasticity in high-G turns

S. J. Newman 531 A theoretical model for predicting the blade sailing behaviour of a semi-rigid rotor helicopter

Khanh Nguyen and Inderjit Chopra 545 Application of higher harmonic control to hingeless rotor systems

Heinz-Jürgen Pausder and Gerhard Bouwer 557 Recent results of in-flight simulation for helicopter ACT research

Arnaud Dehondt and François Toulmay 573 Influence of fuselage on rotor inflow performance and trim

O. Rand and A. Rosen 587 Parametric study of a prescribed wake model of a rotor in forward flight